

REMARKS

INTRODUCTION

By way of the present amendment, former claims 2, 5 and 6 have been cancelled. Claims 1, 3, 7, 8, 9, 10 and 12 have been amended to clarify the scope thereof, and new claims 21 and 22 added, such that claims 1, 3, 4, and 7-22 are currently pending. Applicants respectfully request reconsideration of the application in view of the forgoing amendments and the following arguments.

CLAIM REJECTIONS – 35 USC 112

The Examiner has objected to terms in claims 8 and 10 that lacked antecedent basis. These claims have been amended accordingly.

CLAIM REJECTIONS – 35 USC 102 and 103

As a preliminary point, the Examiner has cited as the primary reference Johnston et al. (U.S. Patent No. 4,529,968). However, U.S. Patent no. 4,529,968 names different inventors. Based on the Figures referenced by the Examiner, Applicant believes that the Examiner in fact meant to refer to Johnston et al. (U.S. Patent No. 4,814,760), and has drafted the following reply based on this assumption.

The Examiner rejected claims 1-4, and 8-10 and 12 under 35 USC 102(b) as being anticipated by Johnston et al. (U.S. Patent No. 4,814,760); claims 5 and 6 under 35 USC 103(a) as being unpatentable over Johnston in view of Penz (U.S. Patent No 4,224,615); claims 7, 13-19 and 20 under 35 USC 103(a) as being unpatentable over Johnston in view of Bisset et al. (U.S. Patent No. 5,920,309); and claim 11 under 35 USC 103(a) as being unpatentable over Johnston in view of Nohono et al (U.S. patent no 6,239,788). Reconsideration and withdrawal of these rejections are requested for the following reasons.

Independent claim 1 has been amended to clarify that the touchscreen liquid crystal display also includes:

“a reference electrode in the liquid crystal display overlapping with the first or second electrodes to form reference pixel elements, the measurement circuit comprising a comparison circuit for comparing the measured voltages to reference voltages measured from the reference pixel elements, wherein the reference pixel elements are located outside of a viewable area of the liquid crystal display a sufficient distance so as not to be substantially affected by external pressure applied to the viewing surface.”

By this amendment the subject matter of original claims 2, 5 and 6 (now cancelled) have been incorporated into claim 1, with further clarifying amendments. Support for such amendments can be found throughout the specification as filed, including for example paragraph [0022].

Thus, the display of amended claim 1 includes features not present in Johnston, namely: a reference electrode that overlaps with either the first or second electrode, forming reference pixel elements, and a measurement circuit that includes a comparison circuit for comparing the measured voltages to reference voltages measured from the reference pixel elements, the reference pixel elements are located outside of a viewable area of the liquid crystal display a sufficient distance so as not to be substantially affected by external pressure applied to the viewing surface. In Johnston, the sensed voltage appearing across element 50 as a result of the pressure of the stylus 15 is compared with a threshold voltage (col.3, lines 33-40).

As noted above, the Examiner rejected claims 5 and 6, the subject matter of which has been incorporated into present claim 1, under 35 USC 103(a) as being unpatentable over Johnston in view of Penz. Applicant respectfully submits that

present claim 1, which includes additional clarifying limitations beyond what was included in original claims 5 and 6, is patentable over Johnston in view of Penz for the following reasons.

Neither Johnston or Penz disclose a reference electrode that overlaps with either the first or second electrode, forming reference pixel elements – rather Penz discloses a single reference "cell" C. The use of a reference electrode that overlaps with either the first or second electrode, forming reference pixel elements, provides a structure having a plurality of reference pixel elements that can be sampled for comparison purposes, for improved accuracy.

Furthermore, neither Johnston or Penz explicitly disclose the use of reference pixel elements that are located outside of a viewable area of the liquid crystal display a sufficient distance so as not to be substantially affected by external pressure applied to the viewing surface.

It is respectfully submitted that claims 3, 4, 7, 8, 9, 10, 11 and 21 which depend from claim 1 are patentable for the same reason as claim 1. It is also noted that these dependent claims add further patentable features.

For example new claim 21 adds the further limitation that the reference electrode forms the reference liquid crystal pixel elements with the first electrodes, and the second electrodes are each individually sampled to acquire the measured voltages, the reference electrode being driven with the same data as the second electrode being sampled (for support, please see the final sentence of paragraph [0026]). Such a feature is neither disclosed by or suggested in the cited references.

Independent method claim 12 has been amended in a manner similar to independent device claim 1, and it is respectfully submitted that amended claim 12

and the claims 13-20 that depend therefrom are directed to patentable subject matter for the same reasons as stated above in respect of amended claim 1.

New independent claim 21 has been added to further clarify the scope of protection being sought. Claim 21 includes additional details about how voltages are acquired from the display pixel elements and reference pixel elements. Support for new claim 1 can be found throughout the specification and drawings as originally filed, including for example, Figure 4 and paragraphs [0026]-[0030].

Claim 21 clarifies that the LCD display includes a measurement circuit coupled to the electrodes for scanning at least some of the first electrodes by: measuring display pixel element voltages for at least some of the display pixel elements formed by the first electrode being scanned, and for each display pixel element for which a display pixel element voltage is measured, measuring a corresponding reference pixel element voltage at the reference pixel element that is formed by the reference electrode overlapping with the same second electrode that forms with the first electrode being scanned the display pixel element. Also, claim 21 specifies that the measurement circuit detects in dependence on the measured display pixel element voltages and the corresponding reference pixel element voltages a relative displacement between at least some of the first electrodes and the second electrodes in response to external pressure applied to the viewing surface.

Thus, in the LCD of claim 21, when a display pixel element voltage is measured, a corresponding reference pixel element voltage is also measured between the reference electrode and the same second electrode that the display pixel voltage element is being measured relative to. Such a configuration can improve measurement accuracy, and is not shown in the cited art.

In view of the forgoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted.

A handwritten signature in dark ink, appearing to read 'D. Greer', is written over a horizontal line.

David J. Greer, Reg. No. 43,395
Ridout & Maybee LLP
One Queen Street East, Suite 2400
Toronto, Ontario
Canada
416-868-1482

Customer Number 23577